Location: Turner - Building #64

				EMISS	OR ESTIMATES		
[		Maximum Equipment Capacity	Emission	Factors from EPA 42	:	following est based on Emission	
EMISSIONS	Fuel		Reference Table		calculated	calculated	calculated
		MMBtu/hr			$\overline{}$		
[	Gas	1.339		lb <sub>E</sub> /10° sof	fb <sub>e</sub> /MMBtu	lb <sub>u</sub> /hr	ton <sub>s</sub> /yr
co			EPA 42 Table 1.4-1	84	0.082	1.10 E-01	4.83 E-01
NOx			EPA 42 Table 1.4-1	100	0.098	1.31 E-01	5.75 E-01
50,		1 1 1	EPA 42 Table 1.4-2	0.60	0.00059	7.88 E-04	3.45 E-03
PM10			EPA 42 Table 1.4-2 EPA 42 Table 1.4-2	7.60 7.60	0.0075	9.98 E-03 9.98 E-03	4.37 E-02
Pb			EPA 42 Table 1.4-2 EPA 42 Table 1.4-2	0.0005	4.90 E-07	6.56 E-03	4.37 E-02 2.87 E-06
voc			EPA 42 Table 1.4-2	5.50	0.005	7.22 E-03	3.16 E-02
Toc			EPA 42 Table 1.4-2	11.00	0.003	1.44 E-02	6.32 E-02
2-Methylnaphthalene		1 1 1	EPA 42 Table 1.4-3	2.4 E-05	2.35 E-08	3.15 E-08	1.38 E-07
3-Methylchloranthrene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.36 E-09	1.03 E-08
7,12-Dimethylberiz(a)anthracite		1 1	EPA 42 Table 1.4-3	1.6 E-05	1.57 E-08	2.10 E-08	9.20 E-08
Acenaphthene			EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.36 E-09	1.03 E-08
Agenaphthylene			EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.36 E-09	1.03 E-08
Anthrecene			EPA 42 Table 1.4-3	2.4 E-06	2.35 E-09	3.15 E-09	1,38 E-08
Arsenio		1 1	EPA 42 Table 1.4-4	2.0 E-04	1.96 E-07	2.63 E-07	1.15 E-06
Benzo(a)anthrasene		1 1 1	EPA 42 Table 1.4-4	4.4 E-03	4.31 E-06 1.76 E-09	5.78 E-06	2.53 E-05
Benzotajanthracene		! I I	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.8 E-06 2.1 E-03	2.06 E-06	2.36 E-09 2.76 E-06	1.03 E-06
Benzo(a)pyrene			EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	1.58 E-09	1.21 E-05 6.90 E-09
Benzo(b)fluoranthene			EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.36 E-09	1.03 E-08
Benzo(g,h,i)perylene		1 1	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	1.58 E-09	6.90 E-09
Benzo(k)fluoranthene		1 1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.36 E-09	1.03 E-08
Beryllium			EPA 42 Table 1.4-4	1.2 E-05	1.18 E-08	1.58 E-08	6.90 E-08
Butane			EPA 42 Table 1.4-3	2.1 E+00	2.06 E-03	2.76 E-03	1.21 E-02
Cadmium			EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	1.44 E-06	6.32 E-06
Chromium		1 1	EPA 42 Table 1.4-4	1.4 E-03	1.37 E-06	1.84 E-06	8.05 E-06
Chrysene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.36 E-09	1.03 E-08
Cobalt			EPA 42 Table 1.4-4	8.4 E-05	8.24 E-08	1.10 E-07	4.83 E-07
Copper Dibenzo(s,h)anthracene		1 1	EPA 42 Table 1.4-4 EPA 42 Table 1.4-3	8.5 E-04 1.2 E-06	8.33 E-07	1.12 E-06 1.58 E-09	4.89 E-06 6.90 E-09
Dichlorobenzene		' ' '	EPA 42 Table 1.4-3	1.2 E-03	1.18 E-08	1.58 E-06	6.90 E-08
Ethana			EPA 42 Table 1.4-3	3.1 E+00	3.04 E-03	4.07 E-03	1.78 E-02
Fluoranthene			EPA 42 Table 1.4-3	3.0 E-06	2.94 E-09	3.94 E-09	1.72 E-08
Fluorene			EPA 42 Table 1.4-3	2.8 E-06	2.75 E-09	3.68 E-09	1.61 E-08
Formaldehyde			EPA 42 Table 1.4-3	7.5 E-02	7.35 E-05	9.85 E-05	4.31 E-04
Hexane			EPA 42 Table 1.4-3	1.8 E+00	1.76 E-03	2.36 E-03	1.03 E-02
Indeno(1,2,3-od)pyrene			EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.36 E-09	1.03 E-08
Manganese			EPA 42 Table 1.4-4	3.8 E-04	3.73 E-07	4.99 E-07	2.18 E-06
Mercury			EPA 42 Table 1.4-4	2.6 E-04	2.55 E-07	3.41 E-07	1.49 E-06
Methane Molybdenum		1 1	EPA 42 Table 1.4-2 EPA 42 Table 1.4-4	2.30	0.00225 1.08 E-06	3.02 E-03	1.32 E-02
Naphthalene			EPA 42 Table 1.4-4 EPA 42 Table 1.4-3	1.1 E-03 6.1 E-04	1.08 E-06 5.98 E-07	1.44 E-06 8.01 E-07	6.32 E-06 3.51 E-06
Niokel			EPA 42 Table 1.4-4	2.1 E-03	2.06 E-06	2.76 E-06	1.21 E-05
Pentane			EPA 42 Table 1.4-3	2.6 E+00	2.55 E-03	3.41 E-03	1.49 E-02
Phenanathrene			EPA 42 Table 1.4-3	1.7 E-05	1.67 E-08	2.23 E-08	9.77 E-08
Propens	l		EPA 42 Table 1.4-3	1.6 E+00	1.57 E-03	2.10 E-03	9.20 E-03
Pyrene			EPA 42 Table 1.4-3	5.0 E-06	4.90 E-09	6.56 E-09	2.87 E-08
Selenium		1	EPA 42 Table 1.4-4	2.4 E-05	2.35 E-08	3.15 E-08	1.38 E-07
Taluene			EPA 42 Table 1,4-3	3.4 E-03	3.33 E-06	4.46 E-06	1.95 E-05
Vanadium			EPA 42 Table 1.4-4	2.3 E-03	2.25 E-06	3.02 E-06	1.32 E-05
Zinc			EPA 42 Table 1.4-4	2.9 E-02	2.84 E-05	3.81 E-05	1.67 E-04

- Emission factor for "Small Boilers" and "Uncontrolled".

  Potential hours of operation of boiler (annual) > Actual hours of operation of boiler (annual) > 1,104 hours/year

  Actual hours of operation of boiler (summer: June 1 to August 31) = 92 days/yr x 12 hr/day = 1,104 hours/year

  Boiler used during summer for hot water.

Abbreviations used::

MMBtu Milion Blu
hr Hours
yr Years
Ibg Pounds of emissions ton<sub>a</sub> Tons of emissions

Emissions ISU Small Equip 6/24/2003 B11 1 of 1 @2:57PM Syed

Location: Gale Life Science (Biology) - Building #65

				EMISS	ON ESTIMATES		
ļ		Maximum Equipment Capacity	Emission i	Factors from EPA 42	ı:	following esti based on Emissio	
EMISSIONS	Fuel		Reference Table		calculated	calculated	calculated
		MM8twhr					
	Gas	2.678		(b <sub>2</sub> /10° sof	lb <sub>s</sub> /MMBtu	(b <sub>a</sub> /hr	ton <sub>e</sub> /yr
co		1 1 1	EPA 42 Table 1.4-1	84	0.082	2.21 E-01	9.66 E-01
NO <sub>x</sub>		i I I	EPA 42 Table 1.4-1	100	0.098	2.63 E-01	1.15 E+00
SO <sub>2</sub>		1 1 1	EPA 42 Table 1.4-2	0.60	0.00059	1.58 E-03	6.90 E-03
PM10		1 1 1	EPA 42 Table 1.4-2	7.60	0.0076	2.00 E-02	8.74 E-02
PM		, , ,	EPA 42 Table 1.4-2	7.60	0.0075	2.00 E-02	8.74 E-0
Pb		1 1 1	EPA 42 Table 1.4-2	0.0005	4.90 E-07	1.31 E-06	5.75 E-0
voc		1 1 1	EPA 42 Table 1.4-2	5.50	0.005	1.44 E-02	6.32 E-0
100		1 1	EPA 42 Table 1.4-2 EPA 42 Table 1.4-3	11.00 2.4 E-05	2.35 E-08	2.89 E-02 6.30 E-08	1.26 E-0 2.76 E-0
2-Methylnaphthalene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	4.73 E-09	2.07 E-0
3-Methylchioranthrene 7,12-Dimethylbenz(s)anthracite		1 1	EPA 42 Table 1.4-3	1.6 E-05	1.57 E-08	4.20 E-08	1.84 E-0
Acenaphthene			EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	4.73 E-09	2.07 E-0
Acenaphthylene		1 ! !	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	4.73 E-09	2.07 E-0
Anthracene		1 1 1	EPA 42 Table 1.4-3	2.4 E-06	2.35 E-09	6.30 E-09	2.76 E-0
Arsenia			EPA 42 Table 1.4-4	2.0 E-04	1.96 E-07	5.25 E-07	2.30 E-0
Barium		1 1	EPA 42 Table 1.4-4	4.4 E-03	4.31 E-06	1.16 E-05	5.06 E-0
Senzo(a)anthracene		1 [	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	4.73 E-09	2.07 E-0
Senzene			EPA 42 Table 1.4-3	2.1 E-03	2.06 E-06	5.51 E-06	2.41 E-0
Benzo(a)pyrene		1 1	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	3.15 E-09	1.38 E-0
Benzo(b)fluoranthene		1 [	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	4.73 E-09	2.07 E-0
Benzo(g,h,l)perylens		1 1 :	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	3.15 E-09	1.38 E-0
Benzo(k)fluoranthene			EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	4.73 E-09	2.07 E-0
Beryllium		1 . [	EPA 42 Table 1.4-4	1.2 E-05	1.18 E-08	3.15 E-08	1.38 E-0
Butane		1 1	EPA 42 Table 1.4-3	2.1 E+00 1.1 E+03	2.06 E-03 1.08 E-06	5.51 E-03 2.89 E-06	2.41 E-0 1.26 E-0
Cadmium Chromium		!	EPA 42 Table 1.4-4 EPA 42 Table 1.4-4	1.1 E-03 1.4 E-03	1.37 E-06	3.68 E-06	1.61 E-0
Chrysene	}	1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	4.73 E-09	2.07 E-0
Cobatt		1 1	EPA 42 Table 1.4-4	8.4 E-05	8.24 E-08	2.21 E-07	9.66 E-0
Copper	l	į į į	EPA 42 Table 1.4-4	8.5 E-04	8.33 E-07	2.23 E-06	9.77 E-0
Dibenzo(s,h)anthracene		1 1	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	3.15 E-09	1.38 E-0
Dichlorobenzene		]	EPA 42 Table 1.4-3	1.2 E-03	1.18 E-06	3.15 E-06	1.38 E-0
Ethane	1	1 1	EPA 42 Table 1.4-3	3.1 E+00	3.04 E-03	8.14 E-03	3.56 E-0
Fluoranthene	!	1 1	EPA 42 Table 1.4-3	3.0 E-06	2.94 E-09	7.88 E-09	3.45 E-0
Fluorene		1 1	EPA 42 Table 1.4-3	2.8 E-06	2.75 E-09	7.35 E-09	3.22 E-0
Formaldehyde		1 1	EPA 42 Table 1.4-3	7.5 E-02	7.35 E-05	1.97 E-04	8.62 E-0
Hexane	!	1 1	EPA 42 Table 1.4-3	1.8 E+00	1.76 E-03	4.73 E-03	2.07 E-0
Indeno(1,2,3-cd)pyrene	1	1 1	EPA 42 Table 1.4-3	1.6 E-06	1.76 E-09	4.73 E-09	2.07 E-0
Manganese		1 1	EPA 42 Table 1.4-4	3.8 E-04	3.73 E-07	9.98 E-07	4.37 E-0
Mercury		[ [	EPA 42 Table 1.4-4	2.6 E-04 2.30	2.55 E-07 0.00225	6.83 E-07 6.04 E-03	2.99 E-0 2.64 E-0
Methane	l		EPA 42 Table 1.4-2 EPA 42 Table 1.4-4	1,1 E-03	1.08 E-06	2.89 E-06	1,26 E-0
Molybdenum Naphthalene	1	1 1	EPA 42 Table 1.4-3	6.1 E-04	5.98 E-07	1.60 E-06	7.01 E-0
Nickel	1	1 1	EPA 42 Table 1.4-4	2.1 E-03	2.06 E-06	5.51 E-08	2.41 E-0
Pentane	l		EPA 42 Table 1.4-3	2.6 E+00	2.55 E-03	6.83 E-03	2.99 E-0
Phenanathrene	[	1 [	EPA 42 Table 1.4-3	1.7 E-05	1.67 E-08	4.46 E-08	1.95 E-C
Propane	I	1 1	EPA 42 Table 1.4-3	1.6 E+00	1.57 E-03	4.20 E-03	1.84 E-0
Pyrene	1	1	EPA 42 Table 1.4-3	5.0 E-06	4.90 E-09	1.31 E-08	5.75 E-0
Selenium	ì	1 1	EPA 42 Table 1.4-4	2.4 E-05	2.35 E-08	6.30 E-08	2.76 E-0
Toluene		1 1	EPA 42 Table 1.4-3	3.4 E-03	3.33 E-06	8.93 E-06	3.91 E-0
Vanadium	l	( [	EPA 42 Table 1.4-4	2.3 E-03	2.25 E-06	6.04 E-06	2.64 E-0
Zine			EPA 42 Table 1.4-4	2.9 E-02	2.84 E-05	7.61 E-05	3.33 E-0

- Notes:

  1 Emission factor for "Small Boilers" and "Uncontrolled".

  2 Potential hours of operation of boiler (annual) =

  3 Actual hours of operation of boiler (annual) =

  4 Boiler used during summer for hot water stil and steam.

  5 Identifier #B12.

Abbraviations used:

MMBtu Million Btu
hr Hours
yr Years
Ibg Pounds of emissions
tons, Tons of emissions

Emissions ISU Small Equip 6/24/2003 B12 1 of 1 @2:57PM Syed

# Item #13: Boilers

### **Emission Estimates**

Date: 01-Jul-04

Location: Holt Arena Building #60

		T			EMISS	ON ESTIMATES		
į		Maximum Equ	ipment			T	following esti	
		Capacity	, [	Emission P	aotors from EPA 42	: [	based on Emissio	n Factors
EMISSIONS	Fuel	i		Reference Table		calculated	calculated	calculated
			MMBtu/hr					
!	Gau	Total of 4 boilers;	5.040		lb <sub>e</sub> /10° sof	lb <sub>e</sub> /MMBtu	lb <sub>a</sub> /hr	ton <sub>E</sub> /yr
CO)		each boiler with		EPA 42 Table 1.4-1	84 100	0.082 0.098	4.15 E-01 4.94 E-01	1.82 E+00 2.18 E+00
NOx		an output of	!!	EPA 42 Table 1.4-1 EPA 42 Table 1.4-2	0.60	0.00058	2.96 E-03	1.30 E-02
SO <sub>2</sub>		2.10 MMBtu/hr;	1 1	EPA 42 Table 1.4-2	7.60	0.0075	3.76 E-02	1.64 E-01
PM10 PM		Firing rate = 60% =60%x2,10=1,28	1 1	EPA 42 Table 1.4-2	7.60	0.0075	3.76 E-02	1.64 E-01
Pbi		For 4 bollers:		EPA 42 Table 1.4-2	0.0005	4.90 E-07	2.47 E-08	1.08 E-05
voc		=4x1.26 MMBtu/hr	i I	EPA 42 Table 1.4-2	5.50	0.005	2.72 E-02	1.19 E-01
тосі		=5.04 MMBtu/hr	1 1	EPA 42 Table 1.4-2	11.00	0.011	5.44 E-02	2.38 E-01
2-Methylnaphthalens			i i	EPA 42 Table 1.4-3	2.4 E-05	2.35 E-08	1.19 E-07	5.19 E-07
3-Methylohloranthrene		1	[	EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	8.89 E-09	3.90 E-08
7,12-Dimethylbenz(a)anthracite		Į.	ļ ļ	EPA 42 Table 1.4-3	1.6 E-05	1.57 E-08	7.91 E-08	3.46 E-07
Acenaphthene			l i	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	8.89 E-09	3.90 E-08
Acenaphthylene			1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	8.89 E-09	3.90 E-08
Anthracene		1	i i	EPA 42 Table 1.4-3	2.4 E-06	2.35 E-09	1.19 E-08	5.19 E-08
Arsenio		1	1 1	EPA 42 Table 1.4-4	2.0 E-04	1.96 E-07	9.88 E-07	4.33 E-06
Barlum		Į.	( (	EPA 42 Table 1.4-4	4.4 E-03	4.31 E-06	2.17 E-05	9.52 E-05
Benzo(a)anthracene				EPA 42 Table 1.4-3	1.8 E-06 2.1 E-03	1.76 E-09 2.06 E-08	8.89 E-09 1.04 E-05	3.90 E-08 4.54 E-05
Benzene		i	l	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	5.93 E-09	2.60 E-08
Benzo(a)pyrene Benzo(b)fluoranthene		i .	1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	8.89 E-09	3.90 E-08
Benzo(g,h,l)perylene				EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	5.93 E-09	2.60 E-08
Benzo(k)fluoranthene				EPA 42 Table 1.4-3	1.8 E-06	1.75 E-09	8.89 E-09	3.90 E-08
Beryllium		i	l i	EPA 42 Table 1.4-4	1.2 E-05	1.18 E-08	5.93 E-08	2.60 E-07
Butane		1		EPA 42 Table 1.4-3	2.1 E+00	2.06 E-03	1.04 E-02	4.54 E-02
Cadmium		1	1 1	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	5.44 E-08	2.38 E-05
Chromium		l .	1 1	EPA 42 Table 1.4-4	1.4 E-03	1.37 E-06	6.92 E-06	3.03 E-05
Chrysene		Į.		EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	8.89 E-09	3.90 E-08
Cobalt			1	EPA 42 Table 1.4-4	8.4 E-05	8.24 E-08	4.15 E-07	1.82 E-06
Copper		1	1	EPA 42 Table 1.4-4	8.5 E-04	8.33 E-07	4.20 E-06	1.84 E-05
Olbenzo(s,h)anthracene		1	1 1	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	5.93 E-09	2.60 E-08
Diphiorobenzene			1	EPA 42 Table 1.4-3	1.2 E-03	1.18 E-06	5.93 E-06	2.60 E-05
Ethane		l	1	EPA 42 Table 1.4-3	3.1 E+00 3.0 E-06	3.04 E-03 2.94 E-09	1.53 E-02 1.48 E-08	6.71 E-02 6.49 E-08
Fluoranthene Fluorene		1		EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	2.8 E-06	2.94 E-09	1.38 E-08	6.06 E-08
Formaldehyde			l i	EPA 42 Table 1.4-3	7.5 E-02	7.35 E-05	3.71 E-04	1.62 E-03
Hexane		}	1 1	EPA 42 Table 1.4-3	1.8 E+00	1.76 E-03	8.89 E-03	3.90 E-02
Indeno(1,2,3-cd)pyrene		1		EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	8.89 E-09	3.90 E-08
Manganese		l	l i	EPA 42 Table 1.4-4	3.8 E-04	3.73 E-07	1.88 E-06	8.22 E-06
Mercury		i		EPA 42 Table 1.4-4	2.6 E-04	2.55 E-07	1.28 E-06	5.63 E-06
Methans		i		EPA 42 Table 1.4-2	2.30	0.00225	1.14 E-02	4.98 E-02
Molybdenum		1	1	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	5.44 E-08	2.38 E-05
Naphthalene		1 .		EPA 42 Table 1.4-3	6.1 E-04	5.98 E-07	3.01 E-06	1.32 E-05
Nickel		l	( )	EPA 42 Table 1.4-4	2.1 E-03	2.06 E-06	1.04 E-05	4.54 E-05
Pentane		1	1	EPA 42 Table 1.4-3	2.6 E+00	2.55 E-03	1.28 E-02	5.63 E-02
Phenanathrene			[ ]	EPA 42 Table 1.4-3	1.7 E-05 1.6 E+00	1.67 E-08 1.57 E-03	8.40 E-08 7.91 E-03	3.68 E-07 3.48 E-02
Propane Pyrene		1	1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.6 E+00 5.0 E-06	1.57 E-03 4.90 E-09	7.91 E-03 2.47 E-08	3.46 E-02
Selenium		i	1	EPA 42 Table 1.4-3	2.4 E-05	2.35 E-08	1.19 E-07	5.19 E-07
Toluene		l	l J	EPA 42 Table 1.4-4	2.4 E-03	3.33 E-08	1.88 E-05	7.38 E-05
Vanadium		1		EPA 42 Table 1.4-4	2.3 E-03	2.25 E-06	1.14 E-05	4.98 E-05
		1	1	EPA 42 Table 1.4-4	2.9 E-02	2.84 E-05	1.43 E-04	8.28 E-04

- Emission factor for "Small Boilers" and "Uncontrolled".

  Potential hours of operation of boiler (annual) = Actual hours of operation of boiler (writer: Sept 1 to May 31) = 273 days/year x 24 hours/day = 6,552 hours/year Boilers used during writer for heating.

- Abbrevistions used;:

  MMBtu Millon Btu
  hr Hours
  yr Years
  Ibs Pounds of emissions
  tons Tons of emissions

Emissions ISU Small Equip 6/24/2003 B13 1 of 1 @2:57PM Syad

# Item #14: Boilers

### **Emission Estimates**

Date: 01-Jul-04

Location: Holt Arena Building #60

					EMISSIO	H ESTIMATES		
]		Maximum Equ		F-lester.	Factors from EPA 42:		following estir	
i .		Capacity	' [	Emission	ractors from EPA 42:		Dased on Emissio	n rectors
EMISSIONS	Fuel			Reference Table		calculated	calculated	calculated
	_		MMBtwhr					
co	Gas	Total of 2 boilers;	2.870	EPA 42 Table 1.4-1	lb <sub>2</sub> /10 <sup>4</sup> sof 84	0.082	ib <sub>e</sub> /hr 2.36 E-01	ton <sub>e</sub> /yr
NO.		an output of	1 1	EPA 42 Table 1.4-1	100	0.082	2.81 E-01	1.04 E+00
so.i		2.870 MMBtu/hr:		EPA 42 Table 1.4-2	0.60	0.00059	1.69 E-03	7.39 E-03
PM10		and at a		EPA 42 Table 1.4-2	7.60	0.0075	2.14 E-02	9.37 E-02
PM		Firing rate of 50%		EPA 42 Table 1.4-2	7.60	0.0075	2.14 E-02	9.37 E-02
Pb		=60%x2.87=1.436		EPA 42 Table 1.4-2	0.0005	4.90 E-07	1.41 E-06	6.16 E-06
voci	[ ]	For 2 boilers:	1 1	EPA 42 Table 1.4-2	5.50	0.005	1.55 E-02	6.78 E-02
тос		=2x1.436 MMBtu/hr		EPA 42 Table 1.4-2	11.00	0.011	3.10 E-02	1.36 E-01
2-Methylnaphthalene		=2.870 MMBtu/hr	, ,	EPA 42 Table 1.4-3	2.4 E-05	2.35 E-08	8.75 E-08	2.98 E-07
3-Methylchloranthrene		!	1 1	EPA 42 Table 1.4-3	1.8 E-08	1.78 E-09	5.06 E-09	2.22 E-08
7,12-Dimethylbenz(s)anthracite			1 1	EPA 42 Table 1.4-3	1.6 E-05	1.57 E-08	4.50 E-08	1.97 E-07
Acenaphthene		1	) i	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	5.06 E-09	2.22 E-08
Acenaphthylene		!	1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	5.06 E-09	2.22 E-08
Anthracene		Į .	!!	EPA 42 Table 1.4-3	2.4 E-06	2.35 E-09	6.75 E-09	2.96 E-08
Arsenio Bartum			1 1	EPA 42 Table 1.4-4 EPA 42 Table 1.4-4	2.0 E-04 4.4 E-03	1.96 E-07 4.31 E-06	5.63 E-07 1.24 E-05	2.46 E-06 5.42 E-05
Benzo(a)anthracene		1	1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	1.24 E-05 5.08 E-09	2.22 E-08
Benzene		1	1 1	EPA 42 Table 1.4-3	2.1 E-03	2.06 E-06	5.91 E-06	2.59 E-05
Benzo(a)pyrene		1		EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	3.38 E-09	1.48 E-08
Benzo(b)fluoranthene		Į į	(	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	5.06 E-09	2.22 E-08
Benzo(g,h,i)perviene		1	i 1	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	3.38 E-09	1.48 E-08
Benzo(k)ffuoranthene				EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	5.06 E-09	2.22 E-08
Beryllium		<b>!</b>	1 :	EPA 42 Table 1.4-4	1.2 E-05	1.18 E-08	3.38 E-08	1.48 E-07
Butane			[	EPA 42 Table 1.4-3	2.1 E+00	2.08 E-03	5.91 E-03	2.59 E-02
Cadmium		ı		EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	3.10 E-06	1.36 E-05
Chromium		Ì	) ]	EPA 42 Table 1.4-4	1.4 E-03	1.37 E-06	3.94 E-06	1.73 E-05
Chrysene		1	l 1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-4	1.8 E-06 8.4 E-05	1.76 E-09 8.24 E-08	5.06 E-09 2.36 E-07	2.22 E-08 1.04 E-08:
Cobalt Copper		1	\ '	EPA 42 Table 1.4-4	8.5 E-04	8.33 E-07	2.39 E-06	1.04 E-06
Dibenzo(s,h)anthracene			1	EPA 42 Table 1.4-3	1.2 E-08	1.18 E-09	3.38 E-09	1.48 E-08
Dichlorobenzene			i i	EPA 42 Table 1.4-3	1.2 E-03	1.18 E-06	3.38 E-06	1.48 E-05
Ethane		1	) )	EPA 42 Table 1.4-3	3.1 E+00	3.04 E-03	8.72 E-03	3.82 E-02
Fluoranthene				EPA 42 Table 1.4-3	3.0 E-06	2.94 E-09	8.44 E-09	3.70 E-08
Fluorene		Į.	(	EPA 42 Table 1.4-3	2.8 E-06	2.75 E-09	7.88 E-09	3.45 E-08
Formaldehyde		ŀ		EPA 42 Table 1.4-3	7.5 E-02	7.35 E-05	2.11 E-04	9.24 E-04
Hexane				EPA 42 Table 1.4-3	1.8 E+00	1.76 E-03	5.06 E-03	2.22 E-02
Indeno(1,2,3-od)pyrene		1	i '	EPA 42 Table 1.4-3	1.8 E-06	1.78 E-09	5.08 E-09	2.22 E-08
Manganese		l		EPA 42 Table 1.4-4	3.8 E-04	3.73 E-07	1.07 E-06	4.68 E-06
Mercury		Į	( (	EPA 42 Table 1.4-4	2.6 E-04	2.55 E-07 0.00225	7.32 E-07	3.20 E-06
Methane		ľ		EPA 42 Table 1.4-2 EPA 42 Table 1.4-4	2.30 1.1 E-03	1.08 E-06	6.47 E-03 3.10 E-08	2.83 E-02 1.36 E-05
Molybdenum Naphthalene		I	]	EPA 42 Table 1.4-4 EPA 42 Table 1.4-3	1.1 E-03 6.1 E-04	1.08 E-06 5.98 E-07	3.10 E-06 1.72 E-06	7.52 E-05
Nickel		}	1 1	EPA 42 Table 1.4-3	2.1 E-03	2.06 E-06	5.91 E-06	2.59 E-05
Pentane		l		EPA 42 Table 1.4-3	2.6 E+00	2.55 E-03	7.32 E-03	3.20 E-02
Phenanathrene		I		EPA 42 Table 1,4-3	1.7 E-05	1.67 E-08	4.78 E-08	2.10 E-07
Propane		Í		EPA 42 Table 1.4-3	1.6 E+00	1.57 E-03	4.50 E-03	1.97 E-02
Pyrene		I	]	EPA 42 Table 1.4-3	5.0 E-06	4.90 E-09	1.41 E-08	6.16 E-08
Selenium		}	<b>,</b> 1	EPA 42 Table 1.4-4	2.4 E-05	2.35 E-08	6.75 E-08	2.96 E-07
Toluene		l		EPA 42 Table 1.4-3	3.4 E-03	3.33 E-06	9.57 E-06	4.19 E-05
Vanadium		l	1 1	EPA 42 Table 1.4-4	2.3 E-03	2.25 E-06	6.47 E-06	2.83 E-05
Zìne		<u> </u>	<u> </u>	EPA 42 Table 1.4-4	2.9 E-02	2.84 E-05	8.16 E-05	3.57 E-04

- Notes:

  1 Emission factor for "Small Bollers" and "Uncontrolled".

  2 Potential hours of operation of boller (annus)) =

  3 Actual hours of operation of boller (all year) = 365 days/year x 14 hours/day =

  5,110 hours/year

  5 identifier #814.

Abbreviations used;:

MMBtu Million Btu
hr Hours
yr Years

1b<sub>1</sub> Pounds of emissions
ton<sub>2</sub> Tons of emissions

Emissions ISU Small Equip 6/24/2003 B14 1 of 1 @2:57PM Syed

# Item #15: Boilers

# **Emission Estimates**

Date: 01-Jul-04

(Listed as item #15 on the "Campus Inventory" list).

Location: Red Hill Building #40

				EMISS	ON ESTIMATES		
<b>\</b>		Maximum Equipment Capacity	Emission I	Factors from EPA 42	. 1	fellowing esti based on Emissio	
		Сараоку	CMISSION I	PEGGIS ITOM EPA 42	.	Dased on Emissio	n rations
EMISSIONS	Fuel		Reference Table		calculated	calculated	calculated
		MMBtu/hr					
	Gas	1.126		lb_/10 <sup>4</sup> sof	Ib <sub>a</sub> /MMBtu	(b <sub>e</sub> /hr	ton <sub>e</sub> /yr
co		1 1	EPA 42 Table 1.4-1	84	0.082	9.26 E-02	4.06 E-01
NO <sub>x</sub>			EPA 42 Table 1.4-1	100	0.098	1.10 E-01	4.83 E-01
80;			EPA 42 Table 1.4-2	0.60	0.00059	6.62 E-04	2.90 E-03
PM10		i I I	EPA 42 Table 1.4-2	7.60	0.0075	8.38 E-03	3.67 E-02
PM Pb			EPA 42 Table 1.4-2 EPA 42 Table 1.4-2	7.60 0.0005	0.0075 4.90 E-07	8.38 E-03	3.67 E-02
Voc		1 1	EPA 42 Table 1.4-2	5.50	0.005	5.51 E-07 6.07 E-03	2.42 E-06 2.66 E-02
TOC			EPA 42 Table 1.4-2	11.00	0.003	1.21 E-02	5.31 E-02
2-Methylnaphthalene:			EPA 42 Table 1.4-3	2.4 E-05	2.35 E-08	2.65 E-08	1.16 E-07
3-Methylohloranthrene			EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	1.99 E-09	8.70 E-09
7,12-Dimethylbenz(a)anthracite		1 1	EPA 42 Table 1.4-3	1.8 E-05	1.57 E-08	1.76 E-08	7.73 E-08
Acenaphthene		[	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	1.99 E-09	8.70 E-09
Acenaphthylene		l.	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	1.99 E-09	8.70 E-09
Anthracene			EPA 42 Table 1.4-3	2.4 E-06	2.35 E-09	2.65 E-09	1.16 E-08
Arsenio Berium			EPA 42 Table 1.4-4 EPA 42 Table 1.4-4	2.0 E-04 4.4 E-03	1.98 E-07 4.31 E-08	2.21 E-07 4.85 E-08	9.66 E-07 2.13 E-05
Benzo(s)anthracene		l I i	EPA 42 Table 1.4-3	1.8 E-05	1.76 E-09	4.85 E-06 1.99 E-09	8.70 E-09
Benzene			EPA 42 Table 1.4-3	2.1 E-03	2.06 E-06	2.32 E-06	1.01 E-05
Benzo(s)pyrene			EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	1.32 E-09	5.80 E-09
Senzo(b)fluorenthene			EPA 42 Table 1.4-3	1.8 E-06	1.78 E-09	1.99 E-09	8.70 E-09
Benzo(g,h,i)perylene		1 1	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	1.32 E-09	5.80 E-09
Benzo(k)fluoranthene		l I I	EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	1.99 E-09	8.70 E-09
Beryltlum		1 1	EPA 42 Table 1.4-4	1.2 E-05	1.18 E-08	1.32 E-08	5.80 E-08
Butane			EPA 42 Table 1.4-3	2.1 E+00	2.06 E-03	2.32 E-03	1.01 E-02
Cadmium		1 1	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	1.21 E-06	5.31 E-06
Chromium Chrysene		1 1	EPA 42 Table 1.4-4 EPA 42 Table 1.4-3	1.4 E-03 1.8 E-06	1.37 E-06 1.76 E-09	1.54 E-06 1.99 E-09	6.76 E-06 8.70 E-09
Cobalt		i I I	EPA 42 Table 1.4-4	8.4 E-05	8.24 E-08	9.26 E-08	4.06 E-07
Copper		( (	EPA 42 Table 1.4-4	8.5 E-04	8.33 E-07	9.38 E-07	4.11 E-06
Dibenzo(a,h)anthraoene		]	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	1.32 E-09	5.80 E-09
Dightorobenzene		1 1	EPA 42 Table 1.4-3	1.2 E-03	1.18 E-06	1.32 E-06	5.80 E-06
Ethane		1 1	EPA 42 Table 1.4-3	3.1 E+00	3.04 E-03	3.42 E-03	1.50 E-02
Fluoranthene			EPA 42 Table 1.4-3	3.0 E-06	2.94 E-09	3.31 E-09	1.45 E-08
Fluorens			EPA 42 Yable 1.4-3	2.8 E-08	2.75 E-09	3.09 E-09	1.35 E-08
Formaldehyde		1 1	EPA 42 Table 1.4-3	7.5 E-02	7.35 E-05	8.27 E-05	3.62 E-04
Hexane Indeno(1,2,3-od)pyrene		1 1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.8 E+00 1.8 E-06	1.76 E-03	1.99 E-03 1.99 E-09	8.70 E-03 8.70 E-09
Manganese			EPA 42 Table 1.4-3	1.8 E-06	3.73 E-07	1.99 E-09 4.19 E-07	1.84 E-061
Mercury		1 1	EPA 42 Table 1.4-4	2.6 E-04	2.55 E-07	2.87 E-07	1.26 E-06
Methane		1 1 1	EPA 42 Table 1.4-2	2.30	0.00225	2.54 E-03	1.11 E-02
Molybdenum			EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	1.21 E-06	5.31 E-06
Naphthalene			EPA 42 Table 1.4-3	8.1 E-04	5.98 E-07	6.73 E-07	2.95 E-06
Nickel	1	1 1	EPA 42 Table 1.4-4	2.1 E-03	2.06 E-06	2.32 E-06	1.01 E-05
Pentane			EPA 42 Table 1.4-3	2.8 E+00	2.55 E-03	2.87 E-03	1.26 E-02
Phenanathrene			EPA 42 Table 1.4-3	1.7 E-05	1.67 E-08	1.88 E-08	8.21 E-08
Propane		1 1	EPA 42 Table 1.4-3	1.6 E+00	1.57 E-03	1.76 E-03	7.73 E-03
Pyrene Selenium		1 1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-4	5.0 E-06 2.4 E-05	4.90 E-09 2.35 E-08	5.51 E-09 2.65 E-08	2.42 E-08 1.16 E-07
Toluene			EPA 42 Table 1.4-4 EPA 42 Table 1.4-3	2.4 E-05 3.4 E-03	3.33 E-06	2.65 E-08 3.75 E-06	1.16 E-07 1.64 E-05
Vanadium		1 1	EPA 42 Table 1.4-4	2.3 E-03	2.25 E-06	2.54 E-06	1.04 E-05
Zinc			EPA 42 Table 1.4-4	2.9 E-02	2.84 E-05	3.20 E-05	1.40 E-04

- Emission fector for "Small Bollers" and "Uncontrolled".

  Potential hours of operation of boller (annual) = 8,760 hours/year

  Actual hours of operation of boller (winter: Sept 1 to May 31) = 273 days/year x 24 hours/day = 6,552 hours/year

  Sollers used winting winter for steam purposes.

  Identifier #815.

- Abbreviations used::

  MMBtu Million Btu
  hr Hours
  yr Years
  lb<sub>R</sub> Pounds of emissions
  ton<sub>R</sub> Tons of emissions

Emissions ISU Small Equip 6/24/2003 B15 1 of 1 @2:57PM Syed

Location: Chemistry - Building #03

				EMISS	ON ESTIMATES		
		Maximum Equipment Capacity	Emission	Factors from EPA 42		following esti based on Emissio	
EMISSIONS	Fuel		Reference Table		calculated	calculated	calculated
ĺ	Gas	MMBtu/hr		lbs/10° sof	Ib_MMBtu	lbs/hr	ton_lyr
ေ	446	(	EPA 42 Table 1.4-1	84	0.082	9.50 E-02	4.16 E-01
NO.		i	EPA 42 Table 1.4-1	100	0.098	1.13 E-01	4.95 E-01
80,		1 1	EPA 42 Table 1.4-2	0.60	0.00059	6.78 E-04	2.97 E-03
PM10		1 1	EPA 42 Table 1.4-2	7.60	0.0075	8.59 E-03	3.76 E-02
PM		[	EPA 42 Table 1.4-2	7.60	0.0075	8.59 E-03	3,76 E-02
Pb			EPA 42 Table 1.4-2	0.0005	4.90 E-07	5.65 E-07	2.48 E-06
voc			EPA 42 Table 1.4-2	5.50	0.005	6.22 E-03	2.72 E-02
TOC		1 1	EPA 42 Table 1.4-2	11.00	0.011	1.24 E-02	5.45 E-02
2-Methylnaphthalene		1 1	EPA 42 Table 1.4-3	2.4 E-05	2.35 E-08	2.71 E-08	1.19 E-07 8.91 E-09
3-Methylchloranthrene			EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.8 E-06 1.6 E-05	1.76 E-09 1.57 E-08	2.03 E-09 1.81 E-08	7.92 E-08
7,12-Dimethylbenz(a)anthracite Acenaphthene		]	EPA 42 Table 1.4-3	1.8 E-06	1.37 E-00	2.03 E-09	8.91 E-09
Acenaphthylene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.03 E-09	8,91 E-09
Anthracene		1 1	EPA 42 Table 1.4-3	2.4 E-06	2.35 E-09	2.71 E-09	1.19 E-08
Arsenia		l I I	EPA 42 Table 1.4-4	2.0 E-04	1.96 E-07	2.26 E-07	9.90 E-07
Barium			EPA 42 Table 1.4-4	4.4 E-03	4.31 E-06	4.97 E-08	2.18 E-05
Senzo(a)anthracene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.03 E-09	8.91 E-09
Benzene		i I	EPA 42 Table 1.4-3	2.1 E-03	2.06 E-06	2.37 E-06	1.04 E-05
Benzo(a)pyrene		1 1	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	1.36 E-09	5.94 E-09
Benzo(b)fluoranthene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.03 E-09	8.91 E-09
Benzo(g,h,l)perylene		}	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	1.36 E-09	5.94 E-09 8.91 E-09
Benzo(k)fluoranthene		i i	EPA 42 Table 1.4-3	1.8 E-06 1.2 E-05	1.76 E-09 1.18 E-08	2.03 E-09 1.36 E-08	5.94 E-09
Beryillum Butane		1 !	EPA 42 Table 1.4-4 EPA 42 Table 1.4-3	2.1 E+00	2.06 E-03	2.37 E-03	1.04 E-02
Cadmium		1 1	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	1.24 E-06	5.45 E-08
Chromium		1 1	EPA 42 Table 1.4-4	1.4 E-03	1.37 E-06	1.58 E-06	6.93 E-06
Chrysene	1	1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.03 E-09	8.91 E-09
Cobalt	1	1 1	EPA 42 Table 1.4-4	8.4 E-05	8.24 E-08	9.50 E-08	4.16 E-07
Copper		( (	EPA 42 Table 1.4-4	8.5 E-04	8.33 E-07	9.61 E-07	4.21 E-06
Dibenzo(a,h)anthracene		1 !	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	1.36 E-09	5.94 E-09
Dichlorobenzene	1	1 1	EPA 42 Table 1.4-3	1.2 E-03	1.18 E-06	1.36 E-06	5.94 E-06
Ethane	1	1 1	EPA 42 Table 1,4-3	3.1 E+00	3.04 E-03	3.50 E-03	1.53 E-02
Fluoranthene		1 1	EPA 42 Table 1.4-3	3.0 E-06	2.94 E-09	3.39 E-09	1.49 E-08
Fluorene	Į.		EPA 42 Table 1.4-3	2.8 E-06 7.5 E-02	2.75 E-09 7.35 E-05	3.17 E-09 8.48 E-05	1.39 E-08 3.71 E-04
Formaldehyde Hexane	1	1 1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.8 E+00	1.76 E-03	2.03 E-03	8.91 E-03
Indeno(1,2,3-cd)pyrene		<b>I</b> [	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.03 E-09	8.91 E-09
Manganese	Ì	1 1	EPA 42 Table 1.4-4	3.8 E-04	3.73 E-07	4.30 E-07	1.88 E-06
Mercury		1 1	EPA 42 Table 1,4-4	2.6 E-04	2.55 E-07	2.94 E-07	1.29 E-06
Methane	ļ	, ,	EPA 42 Table 1.4-2	2.30	0.00225	2.60 E-03	1.14 E-02
Molybdenum			EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	1.24 E-06	5.45 E-06
Naphthalene	1	l !	EPA 42 Table 1,4-3	6.1 E-04	5.98 E-07	6.90 E-07	3.02 E-06
Nickel	}	]	EPA 42 Table 1.4-4	2.1 E-03	2.06 E-06	2.37 E-06	1.04 E-05
Pentane	l		EPA 42 Table 1.4-3	2.6 E+00	2.55 E-03	2.94 E-03	1.29 E-02
Phenanethrene	1	1	EPA 42 Table 1.4-3	1.7 E-05	1.67 E-08	1.92 E-08	8.42 E-08
Propane	l	1 1	EPA 42 Table 1.4-3	1.6 E+00	1.57 E-03 4.90 E-09	1.81 E-03	7.92 E-03
Pyrene	l	1 1	EPA 42 Table 1,4-3 EPA 42 Table 1,4-4	5.0 E-06 2.4 E-05	4.90 E-09 2.35 E-08	5.65 E-09 2.71 E-08	2.48 E-08 1.19 E-07
Selenium Toluene	i	1 1	EPA 42 Table 1.4-4 EPA 42 Table 1.4-3	3.4 E-03	3.33 E-06	3.84 E-06	1.19 E-07 1.68 E-05
Variadium	l		EPA 42 Table 1.4-4	2.3 E-03	2.25 E-06	2.60 E-06	1.14 E-05
Zine	1	1 1	EPA 42 Table 1.4-4	2.9 E-02	2.84 E-05	3.28 E-05	1.44 E-04

- Notes:

  1 Emission factor for "Small Boilers" and "Uncontrolled".

  2 Potential hours of operation of boiler (annual) =

  3 Actual hours of operation of boiler (summer: June 1 to August 31) = 92 days/yeer x 24 hours/x 2,208 hours/year

  4 Boiler used during summer for heating.

  5 Identifier #B16.

- Abbreviations used;:

  MMStu Million Stu
  hr Hours
  yr Years
  (bg Pounds of emissions
  - tone Tone of emissions

Emissions ISU Small Equip 6/24/2003 B16 1 of 1 @2:57PM Syed

# **Emission Estimates**

Date: 01-Jul-04

Location: Armory Building #73

			EMISSION ESTIMATES							
	- 1	Maximum Equipment			. 1	following estir				
	ļ	Capacity	Emission	actors from EPA 42	·	based of Emissio	n ractors			
EMISSIONS	Fuel		Reference Table		calculated	calculated	calculated			
		MMBtu/hr					4 4			
اما	Gas	0.650	EPA 42 Table 1.4-1	lbs/10° sof 84	1b <sub>11</sub> /MMBtu 0.082	lb <sub>e</sub> /hr 5.35 E-02	ton <sub>e</sub> /yr 2.34 E-01			
CO NO.		1 1	EPA 42 Table 1.4-1	100	0.098	6.37 E-02	2.79 E-01			
801	ı		EPA 42 Table 1.4-2	0.60	0.00058	3.82 E-04	1.67 E-03			
PM10	l	1 1	EPA 42 Table 1.4-2	7.60	0.0075	4.84 E-03	2.12 E-02			
PM			EPA 42 Table 1.4-2	7.60	0.0075	4.84 E-03	2.12 E-02			
Pb	- 1	1 1	EPA 42 Table 1.4-2	0.0005	4.90 E-07	3.19 E-07	1.40 E-06			
voc			EPA 42 Table 1.4-2	6.50	0.005	3.50 E-03	1.54 E-02			
roc	ļ		EPA 42 Table 1.4-2	11.00 2.4 E-05	0.011 2.35 E-08	7.01 E-03 1.53 E-08	3.07 E-02 8.70 E-08			
2-Methylnaphthalene		l i	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	2.4 E-05 1.8 E-06	1.76 E-09	1.53 E-06 1.15 E-09	5.02 E-09			
3-Methylchloranthrene 7,12-Dimethylbenz(a)anthracite	- 1		EPA 42 Table 1.4-3	1.6 E-05	1.57 E-08	1.02 E-08	4.47 E-08			
Acenaphthene	ĺ	1 1	EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	1.15 E-09	5.02 E-09			
Acenaphthylene		l i	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	1.15 E-09	5.02 E-09			
Anthragene			EPA 42 Table 1.4-3	2.4 E-06	2.35 E-09	1.53 E-09	6.70 E-09			
Arsenio			EPA 42 Table 1.4-4	2.0 E-04	1.96 E-07	1.27 E-07	5.58 E-07			
Sarium	- 1		EPA 42 Table 1.4-4	4.4 E-03	4.31 E-06	2.80 E-06	1.23 E-05			
Benzo(a)anthracene			EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	1.15 E-09 1.34 E-08	5.02 E-09 5.86 E-06			
Benzene			EPA 42 Table 1.4-3	2.1 E-03	2.06 E-06	7.65 E-10	3.35 E-09			
Benzo(a)pyrene		1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.2 E-06 1.8 E-06	1.18 E-09 1.76 E-09	1.15 E-09	5.02 E-09			
Benzo(Þ)fluoranthene		i i	EPA 42 Table 1.4-3	1.8 E-06	1.18 E-09	7.85 E-10	3,35 E-09			
Benzo(g,h,i)perylene Benzo(k)fluoranthene			EPA 42 Table 1.4-3	1.8 E-06	1.78 E-09	1.15 E-09	5.02 E-09			
Beryllum			EPA 42 Table 1.4-4	1.2 E-05	1.18 E-08	7.65 E-09	3.35 E-08			
Butane			EPA 42 Table 1.4-3	2.1 E+00	2.06 E-03	1.34 E-03	5.88 E-03			
Cadmium		i 1	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	7.01 E-07	3.07 E-06			
Chromium			EPA 42 Table 1.4-4	1.4 E-03	1.37 E-06	8.92 E-07	3.91 E-06			
Chrysene	i	1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	1.15 E-09	5.02 E-09			
Cobaft		i !	EPA 42 Table 1.4-4	8.4 E-05 8.5 E-04	8.24 E-08 8.33 E-07	5.35 E-08 5.42 E-07	2.34 E-07 2.37 E-08			
Copper		l [	EPA 42 Table 1.4-4 EPA 42 Table 1.4-3	8.5 E-04 1.2 E-08	1.18 E-09	7.65 E-10	3.35 E-09			
Dibenzo(s,h)anthracene Dichlorobenzene		] ]	EPA 42 Table 1.4-3	1.2 E-03	1.18 E-06	7.65 E-07	3.35 E-06			
Ethane		l 1	EPA 42 Table 1.4-3	3.1 E+00	3.04 E-03	1.98 E-03	8.65 E-03			
Fluoranthene		1	EPA 42 Table 1.4-3	3.0 E-06	2.84 E-09	1.91 E-09	6.37 E-09			
Fluorene		l I .	EPA 42 Table 1.4-3	2.8 E-06	2.75 E-09	1.78 E-09	7.82 E-09			
Formaldehyde			EPA 42 Table 1.4-3	7.5 E-02	7.35 E-05	4.78 E-05	2.09 E-04			
Hexane		l 1	EPA 42 Table 1.4-3	1.8 E+00	1.76 E-03	1.15 E-03	5.02 E-03			
(ndeno(1,2,3-od)pyrene		]	EPA 42 Table 1.4-3 EPA 42 Table 1.4-4	1.8 E-06 3.8 E-04	1.76 E-09 3.73 E-07	1.15 E-09 2.42 E-07	5.02 E-09 1.06 E-08			
Manganese		1 1	EPA 42 Table 1.4-4	2.6 E-04	2.55 E-07	1.66 E-07	7.26 E-07			
Mercury			EPA 42 Table 1.4-2	2.5 2.30	0.00225	1.47 E-03	6.42 E-03			
Malybdenum		,	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	7.01 E-07	3.07 E-06			
Naphthalene		1	EPA 42 Table 1.4-3	6.1 E-04	5.98 E-07	3.89 E-07	1.70 E-06			
Nickel			EPA 42 Table 1.4-4	2.1 E-03	2.06 E-06	1.34 E-06	5.86 E-06			
Pentane			EPA 42 Table 1.4-3	2.6 E+00	2.55 E-03	1.66 E-03	7.26 E-03			
Phenanathrena			EPA 42 Table 1.4-3	1.7 E-05	1.67 E-08	1.08 E-08	4.75 E-08			
Propene		1	EPA 42 Teble 1.4-3	1.6 E+00	1.57 E-03	1.02 E-03	4.47 E-03			
Pyrene			EPA 42 Table 1.4-3 EPA 42 Table 1.4-4	5.0 E-06 2.4 E-05	4.90 E-09 2.35 E-08	3.19 E-09 1.53 E-08	1.40 E-08 6.70 E-08			
Sefenium Toluene		l (	EPA 42 Table 1.4-4 EPA 42 Table 1.4-3	2.4 E-00 3.4 E-03	3.33 E-06	1.53 E-08 2.17 E-08	9.49 E-06			
Vanadium			EPA 42 Table 1.4-4	2.3 E-03	2.25 E-06	1.47 E-06	6.42 E-06			
Zíne			EPA 42 Table 1.4-4	2.9 E-02	2.84 E-05	1.85 E-05	8.09 E-05			

- Notes:

  1 Emission factor for "Small Boilers" and "Uncontrolled".

  2 Potential hours of operation of boiler (annual) =

  3 Actus hours of operation of boiler (winter: Sept 1 to May 31) = 273 days/year x 24 hours/day =

  8,760 hours/year

  8,562 hours/year

  8 Boilers used during winter for heating.

- Abbreviations used;:

  MMBtu Milion Blu
  hr Hours
  yr Years
  libs Pounds of emissions
  tons Tons of emissions

Emissions ISU Small Equip 6/24/2003 B17 1 of 1 @2:57PM Syed

# **Emission Estimates**

Date: 01-Jul-04

Location: Dowling Building #71

				EMISS	ON ESTIMATES			
		Maximum Equipment Capacity	Emission I	actors from EPA 42	.	following estimates based on Emission Factors		
}					1			
EMISSIONS	Fuel		Reference Table		celculated	calculated	calculated	
		MMBtu/hr						
	Gas	[ 0.696[		16 <sub>8</sub> /10° sof	16 <sub>17</sub> /MMB6u 0.062	ib <sub>#</sub> /hr 4.90 E-02	ton <sub>e</sub> /yr 2.15 E-01	
.00			EPA 42 Table 1.4-1 EPA 42 Table 1.4-1	84 100	0.082	5.83 E-02	2.56 E-01	
NOx			EPA 42 Table 1.4-1	0.60	0.00059	3.50 E-04	1.63 E-03	
5Q <sub>1</sub> PM10		i 1 i	EPA 42 Table 1.4-2	7.60	0.0075	4.43 E-03	1.94 E-02	
PM			EPA 42 Table 1.4-2	7.60	0.0075	4.43 E-03	1.94 E-03	
Pb			EPA 42 Table 1.4-2	0.0005	4.90 E-07	2.92 E-07	1.28 E-0	
voci			EPA 42 Table 1.4-2	5.50	0.005	3.21 E-03	1.41 E-0	
TOC			EPA 42 Table 1.4-2	11.00	0.011	6.42 E-03	2.81 E-0	
2-Methylnaphthalene)		1 1	EPA 42 Table 1.4-3	2.4 E-05	2.35 E-08	1.40 E-08	6.13 E-0	
3-Methylchloranthrene		i i i	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	1.05 E-09	4.60 E-0	
7,12-Dimethylbenz(a)anthraoite		\ \ \	EPA 42 Table 1.4-3	1.8 E-05	1.57 E-08	9.33 E-09	4.09 E-0 4.60 E-0	
Acenaphthene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09 1.76 E-09	1.05 E-09 1.05 E-09	4.60 E-0	
Acenaphthylene		l I I	EPA 42 Table 1.4-3	1.8 E-06 2.4 E-06	2.35 E-09	1.40 E-09	8.13 E-0	
Anthrasene		1 1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-4	2.4 E-06 2.0 E-04	1.96 E-07	1.17 E-07	5.11 E-0	
Arsenic		1 1 1	EPA 42 Table 1.4-4	4.4 E-03	4.31 E-06	2.57 E-08	1.12 E-0	
Barlum			EPA 42 Table 1.4-4	1.8 E-06	1.76 E-09	1.05 E-09	4.60 E-0	
Benzo(a)anthracens Benzens		l I	EPA 42 Table 1.4-3	2.1 E-03	2.06 E-06	1,23 E-06	5.37 E-0	
Benzo(a)pyrene			EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	7.00 E-10	3.07 E-0	
Benzo(b)fluoranthene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	1.05 E-09	4.60 E-0	
Benzo(g,h,i)perylene		1 1	EPA 42 Table 1.4-3	1.2 E-08	1.18 E-09	7.00 E-10	3.07 E-0	
Benzo(k)fluoranthene		{	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	1.05 E-09	4.60 E-6	
Beryllium		i i	EPA 42 Table 1.4-4	1.2 E-05	1.18 E-08	7.00 E-09	3.07 E-4	
Butane			EPA 42 Table 1.4-3	2.1 E+00	2.06 E-03	1.23 E-03	5.37 E-0	
Cadmium		1 1	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	6.42 E-07	2.81 E-4	
Chromium		1 1	EPA 42 Table 1.4-4	1.4 E-03	1.37 E-06	8.17 E-07	3.58 E-4 4.60 E-4	
Chrysens		[	EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	1.05 E-09 4.90 E-08	2.15 E	
Cobalt		1 1	EPA 42 Table 1.4-4 EPA 42 Table 1.4-4	8.4 E-05 8.5 E-04	8.24 E-08 8.33 E-07	4.96 E-07	2.17 E-	
Copper			EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	7.00 E-10	3.07 E-	
Dibenzo(s,h)anthracene Dichlorobenzene		1	EPA 42 Table 1.4-3	1.2 E-03	1.18 E-06	7.00 E-07	3.07 E-	
Ethane		ł I	EPA 42 Table 1.4-3	3.1 E+00	3.04 E-03	1.81 E-03	7.92 E-	
Fluoranthene		, ,	EPA 42 Table 1.4-3	3.0 E-06	2.94 E-09	1.75 E-09	7.67 E-	
Fluorene		1 1	EPA 42 Table 1.4-3	2.8 E-08	2.75 E-09	1.63 E-09	7.15 E-	
Formaldehyde		1 1	EPA 42 Table 1.4-3	7.5 E-02	7.35 E-05	4.38 E-05	1.92 E-	
Hexane		1 1	EPA 42 Table 1.4-3	1.8 E+00	1.75 E-03	1.05 E-03	4.60 E-	
Indeno(1,2,3-cd)pyrene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	1.05 E-09	4.60 E-	
Manganese		1	EPA 42 Table 1.4-4	3.8 E-04	3.73 E-07	2.22 E-07	9.71 E-	
Mercury		1	EPA 42 Table 1.4-4	2.6 E-04	2.55 E-07	1.52 E-07	6.64 E-	
Methane		1 1	EPA 42 Table 1.4-2	2.30	0.00225	1.34 E-03 6.42 E-07	5.88 E-	
Molybdenum		1	EPA 42 Table 1.4-4	1.1 E-03 6.1 E-04	1.08 E-08 5.98 E-07	3.56 E-07	1.56 E-	
Naphthalene		1 1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-4	2.1 E-03	2.06 E-06	1.23 E-06	5.37 E4	
Nickel Pentane		<b>1</b>	EPA 42 Table 1.4-3	2.8 E+00	2.55 E-03	1.52 E-03	6.64 E-	
Phonanathrono		1 1	EPA 42 Table 1.4-3	1.7 E-05	1.67 E-08	9.92 E-09	4.34 E-	
Propane			EPA 42 Table 1.4-3	1.6 E+00	1.57 E-03	9.33 E-04	4.09 E-	
Pyrene		i i	EPA 42 Table 1.4-3	5.0 E-06	4.90 E-09	2.92 E-09	1.28 E-	
Selenium		1 1	EPA 42 Table 1.4-4	2.4 E-05	2.35 E-08	1.40 E-08	6.13 E-	
Toluene		1 1	EPA 42 Table 1.4-3	3.4 E-03	3.33 E-08	1.98 E-06	8.69 E-4	
Vanadium		1	EPA 42 Table 1.4-4	2.3 E-03	2.25 E-08	1.34 E-08	5.88 E-0	
Zino		11	EPA 42 Table 1.4-4	2.9 E-02	2.84 E-05	1.69 E-05	7.41 E-0	

Abbreviations used:

MMBtu Million Btu
her Hours
yr Years
Ibs Pounds of emissions
tons Tons of emissions

Emissions ISU Small Equip 6/24/2003 B18 1 of 1 @2:57PM Syed

Location: Alumni House Building #29

				EMISS	ON ESTIMATES		
		Maximum Equipment Capacity	Emission /	actors from EPA 42	.	following esti- based on Emissio	
EMISSIONS	Fuel	j	Reference Table		calculated	calculated	calculate
	- 1 4 5 7						
		MMBtu/hr					
	Gas	0.120	EPA 42 Table 1.4-1	lb <sub>e</sub> /10 <sup>6</sup> sof 84	16 <sub>2</sub> /MMBtu 0.082	lb <sub>€</sub> /hr 9.88 E-03	ton <sub>s</sub> /y 4,33 E-0
CO NO.			EPA 42 Table 1.4-1	100	0.002	1.18 E-02	5,15 E-0
80 <sub>2</sub>			EPA 42 Table 1.4-2	0.60	0.00059	7.06 E-05	3.09 E-0
PM10		1 1	EPA 42 Table 1.4-2	7.60	0.0075	8.94 E-04	3.92 E-0
PM		]	EPA 42 Table 1.4-2	7.60	0.0075	8.94 E-04	3.92 E-0
Pb		1 1	EPA 42 Table 1.4-2	0.0005	4.90 E-07	5.88 E-08	2.58 E-0
voc			EPA 42 Table 1.4-2	5.50	0.005	6.47 E-04	2.83 E-0
тос			EPA 42 Table 1.4-2	11.00	0.011	1.29 E-03	5.67 E-0
2-Methylnaphthalene		1 1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	2.4 E-05 1.8 E-06	2.35 E-08 1.76 E-09	2.82 E-09 2.12 E-10	1.24 E-0 9.28 E-1
3-Methylohioranthrene 7,12-Dimethylbenz(a)anthraoite			EPA 42 Table 1.4-3	1.6 E-05	1.57 E-08	1.88 E-09	8.24 E-0
7,12-Dimethylbenz(ajaninraone) Acenaphthene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.78 E-09	2.12 E-10	9.28 E-1
Acenaphthylene			EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.12 E-10	9.28 E-1
Anthracene		!!!	EPA 42 Table 1.4-3	2.4 E-06	2.35 E-09	2.82 E-10	1.24 E-0
Arsenic		1 1	EPA 42 Table 1.4-4	2.0 E-04	1.96 E-07	2.35 E-08	1.03 E-0
Bartum			EPA 42 Table 1.4-4	4.4 E-03	4.31 E-06	5.18 E-07	2.27 E-0
Benzo(a)anthracens		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.12 E-10	9.26 E-
Benzene		1 1	EPA 42 Table 1.4-3	2.1 E-03	2.06 E-06	2.47 E-07	1.08 E- 6.18 E-
Benzo(a)pyrene		1 1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.2 E-06 1.8 E-06	1.18 E-09 1.76 E-09	1.41 E-10 2.12 E-10	9.28 E-
Benzo(b)fluoranthene		] [	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	1.41 E-10	6.18 E-
Benzo(g,h,i)perylene Benzo(k)fluoranthene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.78 E-09	2.12 E-10	9.28 E-
Beryllium		] ]	EPA 42 Table 1.4-4	1.2 E-05	1.18 E-08	1.41 E-09	6.18 E-
Butane			EPA 42 Table 1.4-3	2.1 E+00	2.06 E-03	2.47 E-04	1.08 E-
Cadmium		} }	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	1.29 E-07	5.67 E-
Chromium			EPA 42 Table 1.4-4	1.4 E-03	1.37 E-06	1.65 E-07	7.21 E-
Chrysene		l l ;	EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	2.12 E-10	9.28 €-
Cobelt		i 1 1	EPA 42 Table 1.4-4	8.4 E-05	8.24 E-08	9.88 E-09	4.33 E-
Copper		1 1	EPA 42 Table 1.4-4	8.5 E-04	8.33 E-07	1.00 E-07	4.38 E-
Dibenzo(s,h)anthracene		1 1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.2 E-06 1.2 E-03	1.18 E-09 1.18 E-06	1.41 E-10 1.41 E-07	6.18 E-
Dichlorobenzene Ethans		1 1	EPA 42 Table 1.4-3	3.1 E+00	3.04 E-03	3.65 E-04	1.60 E-
Fluoranthane			EPA 42 Table 1.4-3	3.0 E-06	2.94 E-09	3.53 E-10	1.55 E-
Fluorene		1 1	EPA 42 Table 1.4-3	2.8 E-06	2.75 E-09	3.29 E-10	1.44 E-
Formaldehyde		1 1	EPA 42 Table 1.4-3	7.5 E-02	7.35 E-05	8.82 E-06	3.86 E-
Hexane		1 1	EPA 42 Table 1.4-3	1.8 E+00	1.76 E-03	2.12 E-04	9.28 E-
indeno(1,2,3-od)pyrene.		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.12 E-10	9.28 E-
Manganese			EPA 42 Table 1.4-4	3.8 E-04	3.73 E-07	4.47 E-08	1.96 E-
Mercury		1 1	EPA 42 Table 1.4-4	2.6 E-04	2.55 E-07	3.06 E-08	1.34 E-
Methane		1 1	EPA 42 Table 1.4-2	2.30	0.00225	2.71 E-04	1.19 E-
Molybdenum Naphthalene		)	EPA 42 Table 1.4-4 EPA 42 Table 1.4-3	1.1 E-03 6.1 E-04	1.08 E-06 5.98 E-07	1.29 E-07 7.16 E-08	5.87 E- 3.14 E-
Naprimaiene Nickei		1 1	EPA 42 Table 1.4-3	2.1 E-03	2.06 E-06	2.47 E-07	1.08 E-
Pentane		1	EPA 42 Table 1.4-3	2.6 E+00	2.55 E-03	3.06 E-04	1.34 E-
Phonanathrone		1 1	EPA 42 Table 1.4-3	1.7 E-05	1.67 E-08	2.00 E-09	8.76 E-4
Propane		1 1	EPA 42 Table 1.4-3	1.6 E+00	1.57 E-03	1.88 E-04	8.24 E-
Pyrene		1 1	EPA 42 Table 1.4-3	5.0 E-06	4.90 E-09	5.88 E-10	2.58 E-
Selenium		1 [	EPA 42 Table 1.4-4	2.4 E-05	2.35 E-08	2.82 E-09	1.24 E-
Toluene		1 1	EPA 42 Table 1.4-3	3.4 E-03	3.33 €-06	4.00 E-07	1.75 E-
Variadium		]	EPA 42 Table 1.4-4	2.3 E-03	2.25 E-06	2.71 E-07	1.19 E-0
Zine		<u> </u>	EPA 42 Table 1.4-4	2.9 E-02	2.84 E-05	3.41 E-08	1,49 E-0

Notes:

1 Emission factor for "Small Boilers" and "Uncontrolled".

2 Potential hours of operation of boiler (annual) =

3 Actual hours of operation of boiler (annual) =

4 Boilers used during winter for heating.

5 Identifier #B19.

# Abbreviations used;: MMBtu Million Btu hr Hours yr Years lbg Pounds of emissions tong Tons of emissions

Emissions ISU Small Equip 6/24/2003 B19 1 of 1 @2:57PM Syed

# **Emission Estimates**

Date: 01-Jul-04

Location: RFC Building #48

		Maylana Farilament		EMISS	ON ESTIMATES	following esti	mates
		Maximum Equipment Capacity	Emission F	factors from EPA 42	t: [	based on Emissio	
EMISSIONS	Fuel		Reference Table		celculated	celculated	calculat
		MMBtu/hr					
i	Gas.	1.500		lbg/10" sof	Ib <sub>e</sub> /MMBtu	lb <sub>s</sub> /hr	tong
col		1 1	EPA 42 Table 1.4-1	84	0.082	1.24 E-01	5.41 E
NO <sub>x</sub>		l I .	EPA 42 Table 1.4-1	100	0.098	1.47 E-01	6.44 E
\$0,			EPA 42 Table 1.4-2	0.63	0.00059	6.82 E-04	3.66 E
PM10		! i	EPA 42 Table 1.4-2	7.60	0.0075	1.12 E-02	4,90 E
PM		l	EPA 42 Table 1.4-2	7.60	0.0075 4.90 E-07	1.12 E-02 7.35 E-07	3.22 E
Pb		1 1	EPA 42 Table 1.4-2	0.0005	0.005	8.09 E-03	3.54 E
voc			EPA 42 Table 1.4-2	5.50	0.005	1.62 E-02	7.09 8
тос		, ,	EPA 42 Table 1.4-2	11.00 2.4 E-05	2.35 E-08	3.53 E-08	1.55 E
2-Methylnaphthalene		l )	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	2.65 E-09	1.18 E
3-Methylohloranthrene		1 1	EPA 42 Table 1.4-3	1.6 E-05	1.57 E-08	2.35 E-08	1.03 E
7,12-Dimethylbenz(a)anthracite		) i	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.65 E-09	1.16 E
Acenaphthene Acenaphthylene		l I	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.85 E-09	1,16 6
Anthracene		t t	EPA 42 Table 1.4-3	2.4 E-06	2.35 E-09	3.53 E-09	1.55 (
Anthracene		l I	EPA 42 Table 1.4-4	2.0 E-04	1.96 E-07	2.94 E-07	1.29
Barlum		l i	EPA 42 Table 1.4-4	4.4 E-03	4.31 E-06	6.47 E-06	2.63
Benzo(a)anthracene		1	EPA 42 Table 1.4-3	1.8 E-06	1,76 E-09	2.85 E-09	1.16
Benzene		i i	EPA 42 Table 1.4-3	2.1 E-03	2.06 E-08	3.09 E-06	1.35
Benzo(a)pyrene		l l	EPA 42 Table 1.4-3	1.2 E-08	1,18 E-09	1.76 E-09	7.73
Benzo(b)fluoranthene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.65 E-09	1.16
Benzo(g,h,i)perylene		]	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	1.76 E-09	7.73
Benzo(k)fluoranthene		<b>!</b>	EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	2.65 E-09	1,18
Beryllium		I I	EPA 42 Table 1.4-4	1.2 E-05	1.18 E-08	1.76 E-08	7.73
Butane		1 1	EPA 42 Table 1.4-3	2.1 E+00	2.06 E-03	3.09 E-03	1.35
Cadmium		1	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	1.62 E-06	7.09
Chromium		I I	EPA 42 Table 1.4-4	1.4 E-03	1.37 E-06	2.06 E-06	9.02
Chrysene		(	EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	2.65 E-09	1,16
Cobatt		1 1	EPA 42 Table 1.4-4	8.4 E-05	8.24 E-08	1.24 E-07	5.41
Copper			EPA 42 Table 1.4-4	8.5 E-04	8.33 E-07	1.25 E-06	5.48
Dibenzo(a,h)anthracens		\$ 1	EPA 42 Table 1.4-3	1.2 E-08	1.18 E-09	1.76 E-09	7.73
Dichlorobenzene		1 1	EPA 42 Table 1.4-3	1.2 E-03	1.18 E-06	1.76 E-06	7.73
Ethane		1 1	EPA 42 Table 1.4-3	3.1 E+00	3.04 E-03	4.55 E-03 4.41 E-09	2.00 1.93
Fluoranthene		1 1	EPA 42 Table 1.4-3	3.0 E-06	2.94 E-09	4.41 E-09 4.12 E-09	1.80
Fluorene			EPA 42 Table 1.4-3	2.8 E-08	2.75 E-09 7.35 E-05	1.10 E-04	4.83
Formaldehyde		\ \	EPA 42 Table 1.4-3	7.5 E-02 1.8 E+00	1.76 E-03	2.65 E-03	1.16
Hexane		1 1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.8 E+00	1.76 E-09	2.65 E-09	1.16
Indeno(1,2,3-cd)pyrene		1 1	EPA 42 Table 1.4-4	3.8 E-04	3.73 E-07	5.59 E-07	2.45
Manganese Mercury		1 1	EPA 42 Teble 1.4-4	2.6 E-04	2.55 E-07	3.82 E-07	1.67
Mercury Methane		1 1	EPA 42 Table 1.4-2	2.30	0.00225	3.38 E-03	1.48
Molybdenum		( )	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	1.62 E-06	7.09
Naphthalene		1 1	EPA 42 Table 1.4-3	6.1 E-04	5.98 E-07	8.97 E-07	3,93
Nickel		1 1	EPA 42 Table 1.4-4	2.1 E-03	2.06 E-06	3.09 E-06	1.35
Pentane		1	EPA 42 Table 1.4-3	2.6 €+00	2.55 E-03	3.82 E-03	1.67
Phenanathrene		1 1	EPA 42 Table 1.4-3	1.7 E-05	1.67 E-08	2.50 E-08	1.10
Propane		l l	EPA 42 Table 1.4-3	1.6 E+00	1.57 E-03	2.35 E-03	1.03
Pyrene		1 1	EPA 42 Table 1.4-3	5.0 E-06	4.90 E-09	7.35 E-09	3.22
Selenium	l	1 1	EPA 42 Table 1.4-4	2.4 E-05	2.35 E-08	3.53 E-08	1.55
Toluene		1	EPA 42 Table 1.4-3	3.4 E-03	3.33 E-06	5.00 E-06	2.19
Vanadium		1	EPA 42 Table 1.4-4	2.3 E-03	2.25 E-06	3.38 E-06	1.48
Zine	l	1 1	EPA 42 Table 1.4-4	2.9 E-02	2.84 E-05	4.26 E-05	1.87

- Notes:

  1 Emission factor for "Small Bollers" and "Uncontrolled".

  2 Potential hours of operation of boller (annual) =

  3 Actual hours of operation of boller (winter: Sept 1 to May 31) = 273 days/year x 24 hours/day =

  8,760 hours/year

  8,760 hours/year

  6,552 hours/year

  1 Bollers used during winter for heating.

Abbreviations used::

MMBBU Million Blu
Ar Hours
yr Years

Ibs Pounds of emissions
tong Tons of emissions

Emissions ISU Small Equip 6/24/2003 820 1 of 1 @2:57PM Syed

# Item #21: Boilers

### **Emission Estimates**

Date: 01-Jul-04

Location: President's Home Building #30

				EMISS	ON ESTIMATES		
		Maximum Equipment				following esti	
		Capacity	Emission	actors from EPA 42	•	based on Emissio	n ractors
EMISSIONS	Fuel		Reference Table		calculated	calculated	calculated
		MMBtu/hr			<del></del>		
	Gas	0,206		lbs/10 <sup>4</sup> sof	lb./MMBtu	lb <sub>e</sub> /hr	ton <sub>s</sub> /yr
col	<b>V</b>		EPA 42 Table 1.4-1	84	0.082	1.72 E-02	7.54 E-02
NO <sub>x</sub>			EPA 42 Table 1.4-1	100	0.098	2.05 E-02	8.97 E-02
80,		! !	EPA 42 Table 1.4-2	0.60	0.00059	1.23 E-04	5.38 E-04
PM10		i	EPA 42 Table 1.4-2	7.60	0.0075	1.56 E-03	6.62 E-03
PM			EPA 42 Table 1.4-2	7.60	0.0075	1.56 E-03	6.82 E-03
Pb		1 1	EPA 42 Table 1.4-2	0.0005	4.90 E-07	1.02 E-07	4.49 E-07
voc			EPA 42 Table 1.4-2	5.50	0.005	1.13 E-03 2.25 E-03	4.94 E-03 9.87 E-03
тос		1 1	EPA 42 Table 1.4-2	11.00 2.4 E-05	2.35 E-08	4.92 E-03	2.15 E-08
2-Methylnaphthalene		1 1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	3.69 E-10	1.62 E-09
3-Methylchloranthrene 7,12-Dimethylbenz(a)anthracite		1 1	EPA 42 Table 1.4-3	1.6 E-05	1.57 E-08	3.28 E-09	1.44 E-08
7,12-Dimethylbenz(E)antificate Acenaphthene		] ]	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	3.69 E-10	1.62 E-09
Acenaphthylene			EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	3.69 E-10	1.62 E-09
Anthracene			EPA 42 Table 1.4-3	2.4 E-06	2.35 E-09	4.92 E-10	2.15 E-09
Arsenia		i I I	EPA 42 Table 1.4-4	2.0 E-04	1.96 E-07	4.10 E-08	1.79 E-07
Barlum		1 1	EPA 42 Table 1.4-4	4.4 E-03	4.31 E-06	9.02 E-07	3.95 E-06
Benzo(a)anthracene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	3.69 E-10	1.62 E-09
Benzene		1 1	EPA 42 Table 1.4-3	2.1 E-03	2.06 E-06	4.30 E-07	1.88 E-06
Benzo(a)pyrene		1 1	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	2.48 E-10	1.08 E-09
Benzo(b)fluoranthene			EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	3.69 E-10	1,62 E-09
Benzo(g,h,i)perylene		l I I	EPA 42 Table 1.4-3	1.2 E-08	1.18 E-09	2.48 E-10	1.08 E-09
Benzo(k)fluoranthene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09 1.18 E-08	3.69 E-10	1.62 E-09 1.08 E-08
Beryillum		1 1 1	EPA 42 Table 1.4-4	1.2 E-05	1.18 E-08 2.08 E-03	2.46 E-09 4.30 E-04	1.08 E-08 1.88 E-03
Butane		, ,	EPA 42 Table 1.4-3	2.1 E+00 1.1 E-03	1.08 E-06	4.30 E-04 2.25 E-07	1.86 E-03 9.87 E-07
Cadmium		1 1	EPA 42 Table 1.4-4 EPA 42 Table 1.4-4	1.4 E-03	1.37 E-06	2.87 E-07	1.26 E-08
Chrysene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-Q9	3.69 €-10	1.62 E-09
Cobatt		<b>)</b>	EPA 42 Table 1.4-4	8.4 E-05	8.24 E-08	1.72 E-08	7.54 E-08
Copper		1 1	EPA 42 Table 1.4-4	8.5 E-04	8.33 E-07	1.74 E-07	7.63 E-07
Dibenzo(a,h)anthracene		, ,	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	2.48 E-10	1.08 E-09
Dichlorobenzene		! i	EPA 42 Table 1.4-3	1.2 E-03	1.18 E-06	2.48 E-07	1.08 E-06
Ethane			EPA 42 Table 1.4-3	3.1 E+00	3.04 E-03	6.35 E-04	2.78 E-03
Fluoranthene		] ]	EPA 42 Table 1.4-3	3.0 €-06	2.94 E-09	6.15 E-10	2.69 E-09
Fluorene		1	EPA 42 Table 1.4-3	2.8 E-08	2.75 E-09	5.74 E-10	2.51 E-09
Formaldehyde		1	EPA 42 Table 1.4-3	7.5 E-02	7.35 E-05	1.54 E-05	6.73 E-05
Hexane		] [	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.8 E+00 1.8 E-06	1.76 E-03 1.76 E-09	3.69 E-04 3.69 E-10	1.62 E-03 1.62 E-09
indeno(1,2,3-cd)pyrene		1 1	EPA 42 Table 1.4-3 EPA 42 Table 1.4-4	1.8 E-06 3.8 E-04	3.73 E-07	7.79 E-08	3.41 E-07
Manganese Mercury		] ]	EPA 42 Table 1.4-4	2.6 E-04	2.55 E-07	5.33 E-08	2.33 E-07
Methans		1 1	EPA 42 Table 1.4-2	2.30	0.00225	4.71 E-04	2.06 E-03
Molybdenum		<b>!</b>	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	2.25 E-07	9.87 E-07
Naphthalene		1	EPA 42 Table-1.4-3	6.1 E-04	5.98 E-07	1.25 E-07	5.47 E-07
Nickei			EPA 42 Table 1.4-4	2.1 E-03	2.06 E-06	4.30 E-07	1.88 E-08
Pentane		1 ).	EPA 42 Table 1.4-3	2.6 E+00	2.55 E-03	5.33 E-04	2.33 E-03
Phenanathrene		1	EPA 42 Table 1.4-3	1.7 E-05	1.67 E-08	3.48 E-09	1.53 E-08
Propane		}	EPA 42 Table 1.4-3	1.6 E+00	1.57 E-03	3.28 E-04	1.44 E-03
Pyrene			EPA 42 Table 1.4-3	5.0 E-06	4.90 E-09	1.02 E-09	4.49 E-09
Selenium		1 1	EPA 42 Table 1.4-4	2.4 E-05	2.35 E-08	4.92 E-09	2.15 E-08
Toluene		1	EPA 42 Table 1.4-3	3.4 E-03	3.33 E-06	6.97 E-07	3.05 E-06 2.06 E-08
Vanadium		1	EPA 42 Table 1.4-4 EPA 42 Table 1.4-4	2.3 E-03 2.9 E-02	2.25 E-08 2.84 E-05	4.71 E-07 5.94 E-08	2.60 E-05
Zine		<u> </u>	CFA 42 180i6 1.4-4	2.8 E-UZ	2.84 E-05	5.84 E-06	2.00 2-05

- Notes:

  1 Emission factor for "Small Boilers" and "Uncontrolled".

  2 Potential hours of operation of boiler (annual) =

  3. Actual hours of operation of boiler (winter: Sept 1 to May 31) = 273 days/year x 24 hours/day =

  4 Boilers used during winter for heating.

  5 Identifier #821.

Abbreviations used:

MMBtu Million Btu
hr Hours
yr Years
Ibg Pounds of emissions
tons Tons of emissions

Emissions ISU Small Equip 6/24/2003 B21 1 of 1 @2:57PM Syed

# Item #22: Boilers

### **Emission Estimates**

Date: 01-Jul-04

Location: President's Home Building #30

				EMISS	ON ESTIMATES		
l i		Maximum Equipment			. 1	following esti	
ļ		Capacity	Emission	Factors from EPA 42		based on Emissio	n Factors
EMISSIONS	Fuel		Reference Table		calculated	calculated	calculated
		MMBtw/hr					
	Gas	0.608		Ibe/10 <sup>6</sup> sof	Ib <sub>E</sub> /MMBtu	lb <sub>s</sub> /hr	ton <sub>s</sub> /yr
) co)		1 1	EPA 42 Teble 1.4-1	84	0.082	4.18 E-02	1.83 E-01
NO <sub>x</sub>			EPA 42 Table 1.4-1	100	0.098	4.98 E-02	2.18 E-01
8O <sub>2</sub>		1 1	EPA 42 Table 1.4-2	0.60	0.00059	2.99 E-04	1.31 E-03
PM10		í I I	EPA 42 Table 1.4-2	7.60 7.60	0.0075	3.79 E-03 3.79 E-03	1.66 E-02
PM Pb			EPA 42 Table 1.4-2 EPA 42 Table 1.4-2	0.0005	4.90 E-07	3.79 E-03 2.49 E-07	1.66 E-02 1.09 E-06
voc		1 1	EPA 42 Table 1.4-2	5.50	0.005	2.74 E-03	1.20 E-02
тос		1 1	EPA 42 Table 1.4-2	11.00	0.011	5.48 E-03	2.40 E-02
2-Methylnaphthalene		1 1	EPA 42 Table 1.4-3	2.4 E-05	2.35 E-08	1.20 E-08	5,24 E-08
3-Methylchloranthrene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	8.96 E-10	3.93 E-09;
7,12-Dimethylbenz(a)anthracits		1	EPA 42 Table 1.4-3	1.8 E-05	1.57 E-08	7.97 E-09	3.49 E-08
Acenaphthene			EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	8.96 E-10	3.93 E-09
Acenaphthylene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	8.96 E-10	3.93 E-09.
Anthracene		1 1	EPA 42 Table 1.4-3	2.4 E-06	2.35 E-09	1.20 E-09	5.24 E-09
Arsenio Berium		l i i	EPA 42 Table 1.4-4 EPA 42 Table 1.4-4	2.0 E-04 4.4 E-03	1.96 E-07 4.31 E-06	9.96 E-08 2.19 E-06	4.36 E-07 9.60 E-06
Benzo(s)anthracene		i i	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	8.96 E-10	3.93 E-09
Benzene			EPA 42 Table 1.4-3	2.1 E-03	2.06 E-06	1.05 E-06	4.58 E-08
Benzo(a)pyrane		l (	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	5.98 E-10	2.52 E-09
Benzo(b)fluoranthene		1 [	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	8.96 E-10	3.93 E-09
Benzo(g,h,i)perylene		1 1	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09	5.98 E-10	2.62 E-09
Benzo(k)fluoranthene		1 1	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	8.96 E-10	3.93 E-09
Beryllium		i i	EPA 42 Table 1.4-4	1.2 E-05	1.18 E-08	5.98 E-09	2.62 E-08
Butane		t 1	EPA 42 Table 1.4-3	2.1 E+00	2.06 E-03	1.05 E-03	4.58 E-03
C#dmlum Chromlum		1 1	EPA 42 Table 1.4-4 EPA 42 Table 1.4-4	1.1 E-03 1.4 E-03	1.08 E-06 1.37 E-06	5.48 E-07 6.97 E-07	2.40 E-06 3.05 E-08
Chrysene			EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	8.96 E-10	3.93 E-09
Cobalt		1 1	EPA 42 Table 1.4-4	8.4 E-05	8.24 E-08	4.18 E-08	1.83 E-07
Copper		1 1	EPA 42 Table 1.4-4	8.5 E-04	8.33 E-07	4.23 E-07	1.85 E-08
Dibenzo(a,h)anthracene		<b>!</b>	EPA 42 Table 1.4-3	1.2 E-08	1.18 E-09	5.98 E-10	2.62 E-09
Dichlorobenzene		1 1	EPA 42 Table 1.4-3	1.2 E-03	1.18 E-06	5.98 E-07	2.62 E-06
Ethane		i	EPA 42 Table 1.4-3	3.1 E+00	3.04 E-03	1.54 E-03	6.76 E-03
Fluoranthene		1 1	EPA 42 Table 1.4-3	3.0 E-06	2.94 E-09	1.49 E-09	6.54 E-09
Fluorene		]	EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	2.8 E-08 7.5 E-02	2.75 E-09 7.35 E-05	1.39 E-09 3.74 E-05	6.11 E-09 1.64 E-04
Formaldehyde Hexana		<b>!</b>	EPA 42 Table 1.4-3	1.8 E+00	1.76 E-03	3.74 E-05 8.98 E-04	3.93 E-03
Indeno(1,2,3-od)pyrene		1 1	EPA 42 Table 1.4-3	1.8 E-08	1.76 E-09	8.96 E-10	3.93 E-09
Manganese			EPA 42 Table 1.4-4	3.8 E-04	3.73 E-07	1.89 E-07	8.29 E-07
Mercury		1 1	EPA 42 Table 1.4-4	2.6 E-04	2.55 E-07	1.29 E-07	5.67 E-07
Methane		1 1	EPA 42 Table 1.4-2	2.30	0.00225	1.15 E-03	5.02 E-03
Molybdenum		<b>i</b> i	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	5.48 E-07	2.40 E-06
Naphthalene		1 1	EPA 42 Table 1.4-3	6.1 E-04	5.98 E-07	3.04 E-07	1.33 E-06
Nickel			EPA 42 Table 1.4-4	2.1 E-03	2.06 E-06	1.05 E-06	4,58 €-06
Pentane Phenanathrene			EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	2.6 E+00 1.7 E-05	2.55 E-03 1.67 E-08	1.29 E-03 8.47 E-09	5.67 E-03 3.71 E-08
Propane			EPA 42 Table 1.4-3	1.7 E-00 1.8 E+00	1.67 E-08 1.57 E-03	7.97 E-04	3.49 E-03
Pyrene		1 1	EPA 42 Table 1.4-3	5.0 E-08	4.90 E-09	2.49 E-09	1.09 E-08
Selenium			EPA 42 Table 1.4-4	2.4 E-05	2.35 E-08	1.20 E-08	5.24 E-08
Toluene		1	EPA 42 Table 1.4-3	3.4 E-03	3.33 E-06	1.69 E-06	7.42 E-08
Vanadium		1 1	EPA 42 Table 1.4-4	2.3 E-03	2.25 E-06	1.15 E-06	5.02 E-08
Zino		L	EPA 42 Table 1.4-4	2.9 E-02	2.64 E-05	1.44 E-05	6.33 E-05

- Notes:

  1 Emission factor for "Small Boilers" and "Uncontrolled".

  2 Potential hours of operation of boiler (annual) =

  3 Actual hours of operation of boiler (annual) =

  4 Boilers used during winter for heating.

  5 Identifier #B22.

# Abbraviations used:: MMBtu Million Btu hr Hours yr Years 10g Pounds of emissions tons Tons of emissions

Emissions ISU Small Equip 6/24/2003 822 1 of 1 @2:57PM Syed

# Item #23: Kiln

### **Emission Estimates**

Date: 01-Jul-04

(Listed as item #23 on the "Campus inventory" list).

Location: Votech Building #46

			<del></del>	EMISSION ESTIMATES				
	Ì	Maximum Equipment Capacity		Emission Factors from EPA 42:			following estimates based on Emission Factors	
EMISSIONS	Fuel	ì	1	Reference Table		calculated	calculated	calculated
Emiosiono								
			MMBtu/hr 0.0143			lb <sub>e</sub> /MMBtu		
co	Gas	Total of 9 kilns;	0.0143	EPA 42 Table 1.4-1	lb <sub>2</sub> /10 <sup>6</sup> sof 84	0.082	(b <sub>2</sub> /hr 1.18 E-03	ton <sub>s</sub> /yr 5.16 E-03
		upto 6 kilns used			100	0.082	1.18 E-03	6.14 E-03
NO <sub>X</sub>		at a time, and		EPA 42 Table 1.4-1	0.60	0.00059	8.41 E-08	3.68 E-05
80 <sub>1</sub> PM10		esch klin with	1 1	EPA 42 Table 1.4-2 EPA 42 Table 1.4-2	7.60	0.0075	1.07 E-04	4.67 E-04
PM		0.0028 MMBtu/hr:		EPA 42 Table 1.4-2	7.60	0.0075	1.07 E-04	4.87 E-04
Pb		therefore equal to		EPA 42 Table 1.4-2	0.0005	4.90 E-07	7.01 E-09	3.07 E-08
voc		=# x 0.0028 MMBtu/hr		EPA 42 Table 1.4-2	5,50	0.005	7.71 E-05	3.38 E-04
TOC		=0.0143 MMBtu/hr		EPA 42 Table 1.4-2	11.00	0.011	1.54 E-04	6.75 E-04
2-Methylnaphthalene			1	EPA 42 Table 1.4-3	2.4 E-05	2.35 E-08	3.38 E-10	1.47 E-09
3-Methylchloranthrene		1		EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.52 E-11	1.10 E-10
7,12-Dimethy(benz(a)anthracite		Į į		EPA 42 Teble 1.4-3	1.6 E-05	1.57 E-08	2.24 E-10	9.82 E-10
Acenaphthene		1	i I	EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.52 E-11	1.10 E-10
Aconaphthylene		1		EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.52 E-11	1.10 E-10
Anthracene		1	1	EPA 42 Table 1.4-3	2.4 E-06	2.35 E-09	3.38 E-11	1.47 E-10
Arsenio		I		EPA 42 Table 1.4-4	2.0 E-04	1.96 E-07	2.80 E-09	1.23 E-08
Barlum		1		EPA 42 Table 1.4-4	4.4 E-03	4.31 E-06	6.17 E-08	2.70 E-07
Benzo(s)anthracene		]		EPA 42 Table 1.4-3	1.8 E-06	1.78 E-09	2.52 E-11	1.10 E-10
Benzene		l .		EPA 42 Table 1.4-3	2.1 E-03	2.06 E-06	2.94 E-08	1.29 E-0
Benzo(s)pyrene		1	1 1	EPA 42 Table 1.4-3	1.2 E-06	1.18 E-09 1.76 E-09	1.68 E-11	7.37 E-1
Benzo(b)fluoranthene		1		EPA 42 Table 1.4-3 EPA 42 Table 1.4-3	1.8 E-06 1.2 E-06	1.76 E-09	2.52 E-11 1.68 E-11	1.10 E-10 7.37 E-1
Benzo(g,h,i)perylene		[		EPA 42 Table 1.4-3	1.2 E-06	1.78 E-09	2.52 E-11	1.10 E-10
Benzo(k)fluoranthene Beryllium		1	]	EPA 42 Table 1.4-3	1.8 E-06	1.18 E-08	1.68 E-10	7.37 E-10
Butane		1	i I	EPA 42 Table 1.4-3	2.1 E+00	2.08 E-03	2.94 E-05	1.29 E-0
Cadmium			, ,	EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	1.54 E-08	6.75 E-0
Chromlum				EPA 42 Table 1.4-4	1.4 E-03	1.37 E-06	1.96 E-08	8.59 E-0
Chrysens				EPA 42 Table 1.4-3	1.8 E-06	1.76 E-09	2.52 E-11	1.10 E-10
Cobatt		1	i i	EPA 42 Table 1.4-4	8.4 E-05	8.24 E-08	1.18 E-09	5.16 E-0
Copper				EPA 42 Table 1.4-4	8.5 E-04	8.33 E-07	1.19 E-08	5.22 E-0
Dibenzo(s,h)anthracene				EPA 42 Table 1.4-3	1.2 E-05	1.18 E-09	1.68 E-11	7.37 E-1
Dichlorobenzene		1		EPA 42 Table 1.4-3	1.2 E-03	1.18 E-06	1.68 E-08	7.37 E-06
Ethane				EPA 42 Table 1.4-3	3.1 E+00	3.04 E-03	4.34 E-05	1.90 E-0
Fluoranthene		1	1	EPA 42 Table 1.4-3	3.0 E-08	2.94 E-09	4.20 E-11	1.84 E-1
Fluorens				EPA 42 Table 1.4-3	2.8 E-06	2.75 E-09	3.92 E-11	1.72 E-10
Formaldehyde				EPA 42 Table 1.4-3	7.5 E-02	7.35 E-05	1.05 E-06	4.60 E-0
Hexane		1	1	EPA 42 Table 1.4-3	1.8 E+00	1.76 E-03	2.52 E-05	1.10 E-0
Indeno(1,2,3-od)pyrene				EPA 42 Table 1.4-3	1.8 E-08 3.8 E-04	1.76 E-09 3.73 E-07	2.52 E-11	1.10 E-10
Manganesel Mercury		1	1	EPA 42 Table 1.4-4 EPA 42 Table 1.4-4	3.8 E-04	2.55 E-07	5.33 E-08 3.64 E-09	2.33 E-06
Mercury		1		EPA 42 Table 1.4-4	2.8 2.30	0.00225	3.22 E-05	1.41 E-0
Molybdenum				EPA 42 Table 1.4-4	1.1 E-03	1.08 E-06	1.54 E-08	6.75 E-0
Naphthalene			1 1	EPA 42 Table 1.4-3	6.1 E-04	5.98 E-07	8.55 E-09	3.74 E-0
Nickel				EPA 42 Table 1.4-4	2.1 E-03	2.06 E-06	2.94 E-08	1.29 E-07
Pentane		1		EPA 42 Table 1.4-3	2.6 E+00	2.55 E-03	3.64 E-05	1.60 E-0
Phenanathrene				EPA 42 Table 1.4-3	1.7 E-05	1.67 E-08	2.38 E-10	1.04 E-0
Propane				EPA 42 Table 1.4-3	1.6 E+00	1.57 E-03	2.24 E-05	9.82 E-0
Pyrane		1	[ [	EPA 42 Table 1.4-3	5.0 E-06	4.90 E-09	7.01 E-11	3.07 E-10
Selenium				EPA 42 Table 1.4-4	2.4 E-05	2.35 E-08	3.38 E-10	1.47 E-09
Toluene		1		EPA 42 Table 1.4-3	3.4 E-03	3.33 E-06	4.77 E-08	2.09 E-07
Vanadium				EPA 42 Table 1.4-4	2.3 E-03	2.25 E-06	3.22 E-08	1.41 E-07
Zinc				EPA 42 Table 1.4-4	2.9 E-02	2.84 E-05	4.06 E-07	1.78 E-00

- Emission factor for "Small Boilers" and "Uncontrolled".

  Potential hours of operation (annual) =

  Actual hours of operation = 24 hours/day x 3 days/wk x 2 wk/mon x 9 monlyr x 5 kilns =

  Kiln used for poteny and sculpting classes.

Abbreviations used::

MMBtu Million Btu
hr Hours
yr Years

Ib<sub>E</sub> Pounds of emissions
ton<sub>E</sub> Tons of emissions

8,760 hours/year 6,480 hours/year

Emissions ISU Small Equip 6/24/2003 K23 1 of 1 @2:57PM Syed